

Date: June 30, 1997

PROGRESS REPORT
on the Project
Automatic Target Recognition (N94-124)

for
SMALL BUSINESS INNOVATION RESEARCH
Phase II

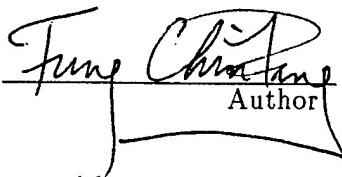
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Contract No.: N00014-96-C-0069
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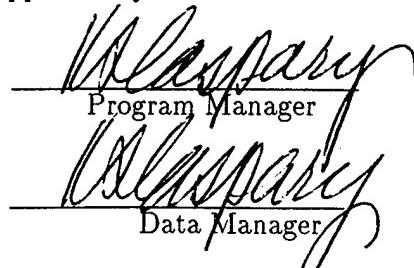
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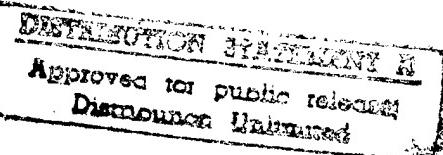
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*Progress Report on the Project Automatic Target
Recognition (N94-124) June 30, 1997*

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AUTOMATIC TARGET RECOGNITION (SBIR N94-124)

TASK D2.a REPORT (June 30, 1997)

Construction of A Digital Signature Database

Executive Summary

Under Task D2.a, our major responsibility is to construct a digital signature database, which will be used in Task D2.b for signature recognition based on elastic matching of the stochastically deformable wavelet template (SDWT). We have built a signature database consisting 100 representative English names. A hard copy of these signatures is included in this report, and the digital signature files are also stored in a CD-ROM for reproduction and/or retrieval.

1 Procedure for Digital Signature Database Construction

The procedure of building the signature database is described below.

- Step 1. Signature Table Design

First, we design a signature table which contains a title and 27 signature fields. Each table is printed on two pages of size 8.5 × 11. Page one contains the title and Item #1 to #12, and Page two contains Item #13 to #27. The title is an English name randomly selected from the dictionary. Signature items are arranged in a 3 × 9 array.

The array can be divided into two parts. the first part consists of Row 1 to Row 7 with authentic signatures while the second part consists of Rows 8 and 9 with forged signatures. In Part one, Item 1 to Item 9 are for signatures without underlines or enclosing boxes, Item 10 to Item 15 are signatures with underlines, and Item 16 to Item 18 are signatures with enclosing boxes. In Part two, Row 8 is the forged signatures without the knowledge of the true signature while Row 9 is the forged signature by imitating the authentic signature.

- Step 2. Signature Collection

One hundred signature tables were given to 100 people. Each person signed Item 1 to Item 21. He was also responsible for finding someone to sign Item 22 to Item 27.

- Step 3. Converting Signature Tables into Images

An AGFA scanner was used to scan the above 100 signature tables into images. After trying different image resolutions to get the best trade-off between the image quality and the image storage requirement, we chose 150 DPI resolution for scanning. Then, signature tables were converted into gray-level images of size 2224 × 2742.

- Step 4. Signature Image Post-processing

Three tasks were performed in this step. The first task is to transform gray-level signature images into binary images. Thresholding based on local intensity is used for image binarization. The second task is to eliminate item numbers on the signature images using image

Dan Crouse

Isaac Galton

April Kennedy

A Kennedy

April Kennedy

April Kennedy

April Kennedy

August Harding

A Harding

Mellon Chamberlain

M. Chamberlain

Rosa Truman

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Cecilia Brenda

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Adolf Valentine

Zane Vanderbilt

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Zane Vanderbilt

Michael Pierce

Michael Pierce Michael Pierce Michael Pierce

Alberta York

Carrie Boris

Isabella Hopkins

Brooks Clinton

Virginia Washington

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Jonathan Lodge

J Lodge

Brice Cornell

Bric Cornell

Bric Cornell

Brice Cornell

Esmonde Cromwell

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Alex Vancouver

Alex Vancouver Alex Vancouver Alex Vancouver

Tyrone Locker

Tyron Lohk Tyn Lohk Tyn Lohk

Tyron Lohk Ty-Lohk Tyro-Lohk

Tyron Lohk Tyn Lohk Tyrn Lohk

Tyr Lohk Ty-Lohk Tyr Lohk

Tyr Lohk Tyr Lohk Tyn Lohk

Tyr Lohk Tyro Lohk Ty Lohk

Tyo Lohk Tyr Lohk Tyr Lohk

Tyo Lohk Tyr Lohk Tyr Lohk

Tyrone Locker Tyrone Locker Tyrone Locker

Solomon Reads

Carolina Austin

Rex Scott

Bob Churchill

Alice Wordsworth

Ada Urquhart

Ada D

Ada Urquhart

Ada Urquhart

Ada Urquhart

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Helen Jefferson

Nightingale Quick

Cuthbert Evans

Gray Hamilton

Tom Springhall

Tom Sprghall

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Jesse Hawkins

Sherman Rowe

Daniel Carlson

Audrey Barkley

Audrey Barkley

Audrey Barkley

Audrey Barkley

Garland Fisher

Nancy MacDonald

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Hilary Irving

Alphonso Fulton

Philips Queen

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Lawrence Flower

Allan Mountbatten

Kurt Watts

Kurt Watt

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Merry Bright

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Merry Bright

Merry Bright

Merry Bright

Homer Johnston

her son

her son

her son

Homer Johnston

Homer Johnston

Homer Johnston